However, in any powder that contains powder other than toner, if the container is configured to convey and discharge the powder from the inside to the outside by inserting a conveying nozzle fixed to a powder conveying device, powder leaked along with removal of the conveying nozzle may be scattered.

The present invention has been made in view of the above circumstances, and an object thereof is to provide a powder container that discharges powder from the inside to the outside by inserting a conveying nozzle and that can prevent scattering of leaked powder when the conveying nozzle is removed, and to provide an image forming apparatus including the powder container.

DISCLOSURE OF INVENTION

According to an embodiment of the present invention, there is provided a powder container that is removably attachable to an image forming apparatus and that includes a container body, including a container opening in a first end and containing image forming powder; a conveyor, arranged inside the container body, to convey the powder from a second end of the container body to the first end along a longitudinal direction of the container body; a nozzle receiver, arranged in the container opening and including a nozzle receiving opening to receive a powder conveying nozzle of the image forming apparatus, to guide the powder conveying nozzle to the inside of the container body; and a scooping portion, scooping up the powder received from the conveyor with the rotation of the scooping portion, to move the powder to a powder receiving opening of the powder conveying nozzle. The nozzle receiving opening is arranged on the inner bottom of the

container opening.

According to another embodiment of the present invention, there is provided a powder container that is removably attachable to an image forming apparatus and that includes a container body, including a container opening in a first end, and containing image forming powder; a conveyor, arranged inside the container body, to convey the powder from a second end of the container body to the first end along a longitudinal direction of the container body; a nozzle receiver, arranged in the container opening and including a nozzle receiving opening to receive a powder conveying nozzle of the image forming apparatus, to guide the powder conveying nozzle to the inside of the container body; and a scooping portion, receiving the powder from the conveyor and rotating to scoop up the received powder from bottom to top in the container body so as to move the powder to a powder receiving opening of the powder conveying nozzle. The nozzle receiver includes: a shutter to open and close the nozzle receiving opening; a supporting portion to support the shutter so as to move; an opening, arranged adjacent to the supporting portion, to communicate with the powder receiving opening of the conveying nozzle inserted in the nozzle receiver. The supporting portion and the opening arranged adjacent to the supporting portion are configured to alternately cross the powder receiving.

According to still another embodiment of the present invention, there is provided a powder container that is removably attachable to an image forming apparatus and that includes a container body, including a container opening in a first end and containing image forming powder; a conveyor, arranged inside the container body, to convey the powder

from a second end of the container body to the first end along a longitudinal direction of the container body; a nozzle receiver, arranged in the container opening and including a nozzle receiving opening to receive a powder conveying nozzle of the image forming apparatus, to guide the powder conveying nozzle to the inside of the container body; and a scooping portion, protruding to the inside of the container body and including a ridge. The nozzle receiver includes: a shutter to open and close the nozzle receiving opening; a supporting portion to support the shutter so as to move; and an opening, arranged adjacent to the supporting portion, to communicate with the powder receiving opening of the conveying nozzle inserted in the nozzle receiver. The ridge of the scooping portion faces to the supporting portion of the nozzle receiver.

In the toner container disclosed in Patent Document 6, the position of the edge of the container opening in the longitudinal direction and the position of the edge of the nozzle insertion member on the side where the nozzle receiving opening is formed in the longitudinal direction are the same. With this positional relationship, nothing can prevent scattering of powder leaked from the nozzle receiving opening when the conveying nozzle is removed from the powder container. Therefore, toner scattering can easily occur. According to the invention, the nozzle receiving opening is arranged on the cylindrical inner bottom of the container opening. Therefore, the edge of the container opening protrudes relative to the edge of the nozzle insertion member where the nozzle receiving opening is formed, in the longitudinal direction. The protruding portion can prevent scattering powder leaked from the nozzle receiving opening when the conveying nozzle is

Therefore, as explained in the above embodiments, it is possible to scoop up the powder by the rotation of the container body. Furthermore, it is possible to prevent the powder from passing through a gap between the conveying nozzle, such as the conveying nozzle 611, and an inner wall, such as the convex 304h, of the container body, such as the container body 33, that forms the scooping portion.

(Embodiment S)

An image forming apparatus, such as the copier 500, includes an image forming unit, such as the printer 100, that forms an image on an image carrier, such as the photoreceptor 41, by using image forming powder, such as toner; a powder conveyor, such as the toner replenishing device 60, that conveys the powder to the image forming unit; and the powder container, such as the toner container 32, according to any one of ~~claims 1 to 18~~ embodiment A to R. The powder container is configured to be detachably attached to the image forming apparatus.

Therefore, as explained in the above embodiments, it is possible to prevent toner scattering, prevent a reduction in the positioning accuracy of the powder container due to the scattered toner, and prevent an increase in the rotational torque of the powder container. Consequently, it is possible to stably convey the powder to the conveying destination. The stable conveyance of the image forming powder can result in the stable amount of powder conveyed to the image forming unit. Therefore, the image density can be stabilized, resulting in good image formation.

EXPLANATIONS OF LETTERS OR NUMERALS

26 feed tray

AMENDED CLAIMS
received by the International Bureau on 23 March 2013 (23.03.2013)

1. A powder container, removably attachable to an image forming apparatus, the powder container comprising:

a container body, including a container opening in a first end and containing image forming powder;

a conveyor, arranged inside the container body, to convey the powder from a second end of the container body to the first end along a longitudinal direction of the container body;

a nozzle receiver, arranged in the container opening and including a nozzle receiving opening to receive a powder conveying nozzle of the image forming apparatus, to guide the powder conveying nozzle to the inside of the container body; and

a scooping portion, scooping up the powder received from the conveyor with the rotation of the scooping portion, to move the powder to a powder receiving opening of the powder conveying nozzle, wherein

the nozzle receiving opening is arranged on the inner bottom of the container opening.

2. The powder container according to claim 1, wherein an outer surface of the container opening of the container body is a positioning section with respect to the image forming apparatus.

3. The powder container according to claim 1, wherein

a rotation axis of the container body is corresponding to the longitudinal direction, and

a cylindrical outer surface of the container opening of the container body includes a rotary shaft section to be inserted in a rotary shaft receiving section of the image forming apparatus.

4. The powder container according to claim 3, wherein the outer surface of the container opening of the container body are a positioning section with respect to the image forming apparatus.

5. The powder container according to claim 3 or 4, wherein the nozzle receiver includes a fixing portion, which has a screw on the outer circumference thereof, to fix the nozzle receiver to the container opening, wherein

a screwing direction of the screw is the same as a rotation direction of the powder container.

6. The powder container according to claim 3 or 4, wherein

the nozzle receiver includes a fixing portion to fix the nozzle receiver to the container opening, and

an outer diameter of the fixing portion is greater than an inner diameter of the container opening,

a protrusion is formed on one of an outer surface of the fixing portion and an inner surface of the container opening while an engaged hole to be engaged with the protrusion is formed on the other one of the outer surface of the fixing portion and the inner surface of the container opening, and

the fixing portion is press fitted to the container opening at a position at which the protrusion and the engaged hole are engaged.

7. The powder container according to claim 3 or 4, wherein

the nozzle receiver includes a fixing portion to fix the nozzle receiver to the container opening,

an outer diameter of the fixing portion is smaller than an inner diameter of the container opening,

a protrusion is formed on one of an outer surface of the fixing portion and an inner surface of the container opening while an engaged hole to be engaged with the protrusion is formed on the other one of the outer surface of the fixing portion and the inner surface of the container opening,

a seal is disposed in a gap between the fixing portion and the container body, and

the nozzle receiver is fitted to the container opening so that the seal is sandwiched and compressed between the fixing portion and the container body at a position at which the protrusion and the engaged hole are engaged.

8. The powder container according to claim 3 or 4, wherein

the nozzle receiver includes a fixing portion to fix the nozzle receiver to the container opening,

the fixing portion includes a first portion and a second portion,

a first outer diameter of the first portion is smaller than an inner diameter of the container opening, corresponding to the rotary shaft section,

a second outer diameter of the second portion is greater than the inner diameter of the container opening, and

the fixing portion is press fitted to the container opening.

9. The powder container according to claim 8, wherein

a press-fitted portion of the fixing portion is located so as to correspond to a position of a container

gear transmitting a rotational force to the container body.

10. The powder container according to claim 8, wherein

a press-fitted portion of the fixing portion is located so as to correspond to a position at which the container opening is thicker than the rotary shaft section.

11. The powder container according to any one of claims 1 to 10, wherein

the nozzle receiving opening is a through hole of an annular seal, and

an enclosed space is formed around the conveying nozzle and between the annular seal and the nozzle receiver.

12. (Amended) A powder container, removably attachable to an image forming apparatus, the powder container comprising:

a container body, including a container opening in a first end, and containing image forming powder;

a conveyor, arranged inside the container body, to convey the powder from a second end of the container body to the first end along a longitudinal direction of the container body;

a nozzle receiver, arranged in the container opening and including a nozzle receiving opening to receive a powder conveying nozzle of the image forming apparatus, to guide the powder conveying nozzle to the inside of the container body; and

a scooping portion, receiving the powder from the conveyor and rotating to scoop up the received powder from bottom to top in the container body so as to move the powder to a powder receiving opening of the powder conveying nozzle, wherein

the nozzle receiver includes

a shutter to open and close the nozzle receiving opening;

a supporting portion to support the shutter so as to move;

an opening, arranged adjacent to the supporting portion, to communicate with the powder receiving opening of the conveying nozzle inserted in the nozzle receiver, wherein

the supporting portion and the opening arranged adjacent to the supporting portion are configured to alternately cross the powder receiving opening.

13. The powder container according to claim 12, wherein one of an inner rim of the opening arranged adjacent to the supporting portion and a combination of the inner rim and an outer surface of the supporting portion serves as a powder bridging that allows the powder to move from the scooping portion to the powder receiving opening.

14. The powder container according to claim 13, wherein the scooping portion and the powder bridging rotate in the same rotation direction and are arranged close to each other such that the inner rim of the opening arranged adjacent to the supporting portion and a convex that rises toward the inside of the container body in the scooping portion are located in this order from downstream to upstream in the rotation direction.

15. (Amended) The powder container according to claim 12, wherein

the container body is held by the powder conveying device so as to rotate relative to the powder conveying

nozzle about a longitudinal direction of the container body as a rotation axis when the powder is conveyed,

the nozzle receiver is fixed to the container body, and

the scooping portion includes a convex that rises inside the container body so as to form a ridge and includes a slope that connects the convex and an inner cylindrical surface of the container body.

page 32, lines 4-11, page 116, lines 22-27

16. (Amended) The powder container according to claim 13, wherein

the container body is held by the powder conveying device so as to rotate relative to the powder conveying nozzle about a longitudinal direction of the container body as a rotation axis when the powder is conveyed,

the nozzle receiver is fixed to the container body,

the scooping portion includes a convex that rises inside the container body so as to form a ridge and includes a slope that connects the convex and an inner cylindrical surface of the container body, and

the convex and the powder bridging are arranged in a contacted state or with a small gap interposed therebetween.

17. (Amended) The powder container according to claim 12, wherein

the container body is held by the powder conveying device,

the nozzle receiver is held by the container body so as to rotate relative to the conveying nozzle about a longitudinal direction of the container body, and

the scooping portion includes a rib protruding from the nozzle receiver to a vicinity of the inner wall of the

container body.

18. A powder container, removably attachable to an image forming apparatus, the powder container comprising:

a container body, including a container opening in a first end and containing image forming powder;

a conveyor, arranged inside the container body, to convey the powder from a second end of the container body to the first end along a longitudinal direction of the container body;

a nozzle receiver, arranged in the container opening and including a nozzle receiving opening to receive a powder conveying nozzle of the image forming apparatus, to guide the powder conveying nozzle to the inside of the container body; and

a scooping portion, protruding to the inside of the container body and including a ridge, wherein

the nozzle receiver includes

a shutter to open and close the nozzle receiving opening;

a supporting portion to support the shutter so as to move;

an opening, arranged adjacent to the supporting portion, to communicate with the powder receiving opening of the conveying nozzle inserted in the nozzle receiver, wherein

the ridge of the scooping portion faces to the supporting portion of the nozzle receiver.

19. (Cancelled)

20. (New) The powder container according to any one of claims 12 to 16, wherein

an outer surface of the container opening is rotatably fitted to an inner surface of a container setting section of the image forming apparatus.

21. (New) An image forming apparatus comprising:

an image forming unit that forms an image on an image carrier by using image-forming powder;

the powder container according to any one of claims 1 to 16, 18 and 20;

a powder conveyor that conveys the powder to the image forming unit and includes a powder conveying nozzle that is inserted into the powder container;

a rotary shaft receiving section that holds the powder container; and

a driving gear that gives the powder container a rotational force, wherein

the powder container is configured to be detachably attached to the image forming apparatus so that an outer surface of the container opening is rotatably fitted to an inner surface of a container setting section of the image forming apparatus.

22. (New) The powder container according to claim 17, wherein

a surface of the rib is bent.

23. (New) The powder container according to claim 12, wherein

the container body is held by the powder conveying device,

the nozzle receiver is held by the container body so as to rotate relative to the conveying nozzle about a longitudinal direction of the container body, and

the scooping portion includes a pair of ribs whose surfaces are bent.

24. (New) The powder container according to any one of claims 17, 22 and 23, wherein

the nozzle receiver is integrated with a conveying blade holder of the conveyor to which conveying blades are fixed.

25. (New) The powder container according to any one of claims 17 and 22 to 24, wherein

a container gear is fixed to the nozzle receiver.

26. (New) The powder container according to any one of claims 17 and 22 to 25, wherein

an outer surface of the nozzle receiver is rotatably fitted to an inner surface of a container setting section of the image forming apparatus.

27. (New) An image forming apparatus comprising:

an image forming unit that forms an image on an image carrier by using image-forming powder;

the powder container according to any one of claims 17 and 22 to 26;

a powder conveyor that conveys the powder to the image forming unit and includes a powder conveying nozzle that is inserted into the powder container;

a container setting section that holds the powder container; and

a driving gear that gives the powder container a rotational force, wherein

the powder container is configured to be detachably attached to the image forming apparatus so that an outer

surface of the nozzle receiver is rotatably fitted to an inner surface of the container setting section.

ABSTRACT

A powder container that is removably attachable to an image forming apparatus and that includes a container body, including a container opening in a first end and containing image forming powder; a conveyor, arranged inside the container body, to convey the powder from a second end of the container body to the first end along a longitudinal direction of the container body; a nozzle receiver, arranged in the container opening and including a nozzle receiving opening to receive a powder conveying nozzle of the image forming apparatus, to guide the powder conveying nozzle to the inside of the container body; and a scooping portion, scooping up the powder received from the conveyor with the rotation of the scooping portion, to move the powder to a powder receiving opening of the powder conveying nozzle. The nozzle receiving opening is arranged on the inner bottom of the container opening.

However, in any powder that contains powder other than toner, if the container is configured to convey and discharge the powder from the inside to the outside by inserting a conveying nozzle fixed to a powder conveying device, powder leaked along with removal of the conveying nozzle may be scattered.

The present invention has been made in view of the above circumstances, and an object thereof is to provide a powder container that discharges powder from the inside to the outside by inserting a conveying nozzle and that can prevent scattering of leaked powder when the conveying nozzle is removed, and to provide an image forming apparatus including the powder container.

DISCLOSURE OF INVENTION

According to an embodiment, there is provided a powder container to be attached to a powder conveying device with a longitudinal direction of the powder container parallel to a horizontal direction. The powder conveying device includes a conveying nozzle, provided with a powder receiving opening to receive powder from the powder container, to convey the powder; an open/close member to open and close the powder receiving opening; a flange provided to the open/close member; a biasing member to bias the open/close member to close the powder receiving opening; and a container setting section to which a part of the powder container is to be fit. The powder container includes a conveyor, arranged inside the powder container, to convey the powder from a second end of the powder container to a first end along the longitudinal direction of the powder container; a container opening protruding from the first end of the power container; a nozzle receiving opening, provided in the container opening, into

which the conveying nozzle provided to the powder conveying device is to be inserted; and a butting portion provided in the container opening, to butt against the flange so as to move the open/close member to open the powder receiving opening. When the powder container is attached to the powder conveying device, the container opening is fitted to the container setting section, and the flange and the biasing member are housed in an inner space of the container opening.

According to another embodiment, there is provided a powder container, removably attachable to an image forming apparatus. The powder container includes a container body, including a container opening in a first end, and containing image forming powder; a conveyor, arranged inside the container body, to convey the powder from a second end of the container body to the first end along a longitudinal direction of the container body; a nozzle receiver, arranged in the container opening and including a nozzle receiving opening to receive a powder conveying nozzle of the image forming apparatus, to guide the powder conveying nozzle to the inside of the container body; and a scooping portion, receiving the powder from the conveyor and rotating to scoop up the received powder from bottom to top in the container body so as to move the powder to a powder receiving opening of the powder conveying nozzle. The nozzle receiver includes a shutter to open and close the nozzle receiving opening; a supporting portion to support the shutter so as to move; an opening, arranged adjacent to the supporting portion, to communicate with the powder receiving opening of the conveying nozzle inserted in the nozzle receiver. The supporting portion and the opening arranged adjacent to the supporting portion are configured to alternately cross the powder receiving

opening.

According to still another embodiment, there is provided a powder container, removably attachable to an image forming apparatus. The powder container includes a container body, including a container opening in a first end and containing image forming powder; a conveyor, arranged inside the container body, to convey the powder from a second end of the container body to the first end along a longitudinal direction of the container body; a nozzle receiver, arranged in the container opening and including a nozzle receiving opening to receive a powder conveying nozzle of the image forming apparatus, to guide the powder conveying nozzle to the inside of the container body; and a scooping portion, protruding to the inside of the container body and including a ridge. The nozzle receiver includes a shutter to open and close the nozzle receiving opening; a supporting portion to support the shutter so as to move; an opening, arranged adjacent to the supporting portion, to communicate with the powder receiving opening of the conveying nozzle inserted in the nozzle receiver. The ridge of the scooping portion faces to the supporting portion of the nozzle receiver.

In the toner container disclosed in Patent Document 6, the position of the edge of the container opening in the longitudinal direction and the position of the edge of the nozzle insertion member on the side where the nozzle receiving opening is formed in the longitudinal direction are the same. With this positional relationship, nothing can prevent scattering of powder leaked from the nozzle receiving opening when the conveying nozzle is removed from the powder container. Therefore, toner scattering can easily occur. According to the invention, the nozzle receiving opening is arranged on the cylindrical inner

bottom of the container opening. Therefore, the edge of the container opening protrudes relative to the edge of the nozzle insertion member where the nozzle receiving opening is formed, in the longitudinal direction. The protruding portion can prevent scattering powder leaked from the nozzle receiving opening when the conveying nozzle is

(Embodiment A1)

A powder container, removably attachable to an image forming apparatus, the powder container comprising:

a container body, including a container opening in a first end and containing image forming powder;

a conveyor, arranged inside the container body, to convey the powder from a second end of the container body to the first end along a longitudinal direction of the container body;

a nozzle receiver, arranged in the container opening and including a nozzle receiving opening to receive a powder conveying nozzle of the image forming apparatus, to guide the powder conveying nozzle to the inside of the container body; and

a scooping portion, scooping up the powder received from the conveyor with the rotation of the scooping portion, to move the powder to a powder receiving opening of the powder conveying nozzle, wherein

the nozzle receiving opening is arranged on the inner bottom of the container opening.

(Embodiment A2)

The powder container according to Embodiment A1, wherein an outer surface of the container opening of the container body is a positioning section with respect to the image forming apparatus.

(Embodiment A3)

The powder container according to Embodiment 1, wherein

a rotation axis of the container body is corresponding to the longitudinal direction, and

a cylindrical outer surface of the container opening of the container body includes a rotary shaft section to be

inserted in a rotary shaft receiving section of the image forming apparatus.

(Embodiment A4)

The powder container according to Embodiment A3, wherein the outer surface of the container opening of the container body are a positioning section with respect to the image forming apparatus.

(Embodiment A5)

The powder container according to Embodiment A3, wherein the nozzle receiver includes a fixing portion, which has a screw on the outer circumference thereof, to fix the nozzle receiver to the container opening, wherein

a screwing direction of the screw is the same as a rotation direction of the powder container.

(Embodiment A6)

The powder container according to Embodiment A3, wherein

the nozzle receiver includes a fixing portion to fix the nozzle receiver to the container opening, and

an outer diameter of the fixing portion is greater than an inner diameter of the container opening,

a protrusion is formed on one of an outer surface of the fixing portion and an inner surface of the container opening while an engaged hole to be engaged with the protrusion is formed on the other one of the outer surface of the fixing portion and the inner surface of the container opening, and

the fixing portion is press fitted to the container opening at a position at which the protrusion and the engaged hole are engaged.

(Embodiment A7)

The powder container according to Embodiment A3,

wherein

the nozzle receiver includes a fixing portion to fix the nozzle receiver to the container opening,

an outer diameter of the fixing portion is smaller than an inner diameter of the container opening,

a protrusion is formed on one of an outer surface of the fixing portion and an inner surface of the container opening while an engaged hole to be engaged with the protrusion is formed on the other one of the outer surface of the fixing portion and the inner surface of the container opening,

a seal is disposed in a gap between the fixing portion and the container body, and

the nozzle receiver is fitted to the container opening so that the seal is sandwiched and compressed between the fixing portion and the container body at a position at which the protrusion and the engaged hole are engaged.

(Embodiment A8)

The powder container according to Embodiment A3, wherein

the nozzle receiver includes a fixing portion to fix the nozzle receiver to the container opening,

the fixing portion includes a first portion and a second portion,

a first outer diameter of the first portion is smaller than an inner diameter of the container opening, corresponding to the rotary shaft section,

a second outer diameter of the second portion is greater than the inner diameter of the container opening, and

the fixing portion is press fitted to the container opening.

(Embodiment A9)

The powder container according to Embodiment A8, wherein

a press-fitted portion of the fixing portion is located so as to correspond to a position of a container gear transmitting a rotational force to the container body.

(Embodiment A10)

The powder container according to Embodiment A8, wherein

a press-fitted portion of the fixing portion is located so as to correspond to a position at which the container opening is thicker than the rotary shaft section.

(Embodiment A11)

The powder container according to Embodiment A1, wherein

the nozzle receiving opening is a through hole of an annular seal, and

an enclosed space is formed around the conveying nozzle and between the annular seal and the nozzle receiver.

CLAIMS

1. A powder container to be attached to a powder conveying device with a longitudinal direction of the powder container parallel to a horizontal direction, the powder conveying device including:

a conveying nozzle, provided with a powder receiving opening to receive powder from the powder container, to convey the powder;

an open/close member to open and close the powder receiving opening;

a flange provided to the open/close member;

a biasing member to bias the open/close member to close the powder receiving opening; and

a container setting section to which a part of the powder container is to be fit,

the powder container comprising:

a conveyor, arranged inside the powder container, to convey the powder from a second end of the powder container to a first end along the longitudinal direction of the powder container;

a container opening protruding from the first end of the power container;

a nozzle receiving opening, provided in the container opening, into which the conveying nozzle provided to the powder conveying device is to be inserted; and

a butting portion provided in the container opening, to butt against the flange so as to move the open/close member to open the powder receiving opening, wherein

when the powder container is attached to the powder conveying device, the container opening is fitted to the

container setting section, and the flange and the biasing member are housed in an inner space of the container opening.

2. The powder container according to claim 1, wherein an outer surface and a front edge surface of the container opening are a positioning section with respect to the powder conveying device.

3. The powder container according to claim 1, further comprising:

a container body that is held by the powder conveying device so as to rotate relative to the conveying nozzle about a longitudinal direction of the container body as a rotation axis when the powder is conveyed, wherein

a cylindrical outer surface of the container opening of the container body includes a rotary shaft section to be inserted in a rotary shaft receiving section of the powder conveying device.

4. The powder container according to claim 3, wherein an outer surface and a front edge surface of the container opening of the container body is a positioning section with respect to the powder conveying device.

5. The powder container according to claim 3 or 4, further comprising:

a nozzle receiver, arranged in the container opening, to guide the conveying nozzle to the inside of the powder container by communicating with the nozzle receiving opening, wherein

the nozzle receiver includes a cylindrical fixing portion, which has a screw on the outer circumference

thereof, to attach the nozzle receiver to the container opening, wherein

a screwing direction of the screw is the same as a rotation direction of the container body in the powder conveying device.

6. The powder container according to any one of claims 1 to 4, further comprising:

a nozzle receiver, arranged in the container opening, to guide the conveying nozzle to the inside of the powder container by communicating with the nozzle receiving opening, wherein

the nozzle receiver includes a cylindrical fixing portion to attach the nozzle receiver to the container opening, and

an outer diameter of the fixing portion is greater than an inner diameter of the container opening,

a protrusion is provided on one of an outer surface of the fixing portion and an inner surface of the container opening while an engaged hole to be engaged with the protrusion is formed on the other one of the outer surface of the fixing portion and the inner surface of the container opening, and

the fixing portion is press fitted to the container opening at a position at which the protrusion and the engaged hole are engaged.

7. The powder container according to any one of claims 1 to 4, further comprising:

a nozzle receiver, arranged in the container opening, to guide the conveying nozzle to the inside of the powder container by communicating with the nozzle receiving opening, wherein

the nozzle receiver includes a cylindrical fixing portion to attach the nozzle receiver to the container opening,

an outer diameter of the fixing portion is smaller than an inner diameter of the container opening,

a protrusion is provided on one of an outer surface of the fixing portion and an inner surface of the container opening while an engaged hole to be engaged with the protrusion is formed on the other one of the outer surface of the fixing portion and the inner surface of the container opening,

a seal is disposed in a gap between the fixing portion and the container body, and

the nozzle receiver is fitted to the container opening so that the seal is sandwiched and compressed between the fixing portion and the container body at a position at which the protrusion and the engaged hole are engaged.

8. The powder container according to any one of claims 1 to 4, further comprising:

a nozzle receiver, arranged in the container opening, to guide the conveying nozzle to the inside of the powder container by communicating with the nozzle receiving opening, wherein

the nozzle receiver includes a cylindrical fixing portion to attach the nozzle receiver to the container opening,

the fixing portion includes a first portion and a second portion,

a first outer diameter of the first portion is smaller than an inner diameter of the container opening, corresponding to the rotary shaft section,

a second outer diameter of the second portion is

greater than the inner diameter of the container opening, and

the fixing portion is press fitted to the container opening.

9. The powder container according to claim 8, wherein a press-fitted portion of the fixing portion is located so as to correspond to a position of a container gear provided at the container opening.

10. The powder container according to claim 8, wherein a press-fitted portion of the fixing portion is located so as to correspond to a position at which the container opening is thicker than the rotary shaft section.

11. The powder container according to any one of claims 1 to 10, wherein

the nozzle receiving opening is a through hole of an annular seal, and

an enclosed space is formed around the conveying nozzle and between the annular seal and the nozzle receiver upon insertion of the conveying nozzle.

12. An image forming apparatus comprising:

an image forming unit that forms an image on an image carrier by using image-forming powder;

a powder conveyor that conveys the powder to the image forming unit; and

the powder container according to any one of claims 1 to 11, wherein

the powder container is configured to be detachably attached to the image forming apparatus.

POWDER CONTAINER AND IMAGE FORMING APPARATUS

ABSTRACT

A powder container is to be attached to a powder conveying device with a longitudinal direction of the powder container parallel to a horizontal direction. The powder conveying device includes a conveying nozzle, provided with a powder receiving opening to receive powder from the powder container, to convey the powder; an open/close member to open and close the powder receiving opening; a flange provided to the open/close member; a biasing member to bias the open/close member to close the powder receiving opening; and a container setting section to which a part of the powder container is to be fit. The powder container includes a conveyor, arranged inside the powder container, to convey the powder from a second end of the powder container to a first end along the longitudinal direction of the powder container; a container opening protruding from the first end of the power container; a nozzle receiving opening, provided in the container opening, into which the conveying nozzle provided to the powder conveying device is to be inserted; and a butting portion provided in the container opening, to butt against the flange so as to move the open/close member to open the powder receiving opening. When the powder container is attached to the powder conveying device, the container opening is fitted to the container setting section, and the flange and the biasing member are housed in an inner space of the container opening.

Fig. 1